The Transmitting Station of the Radio Society of Great Britain

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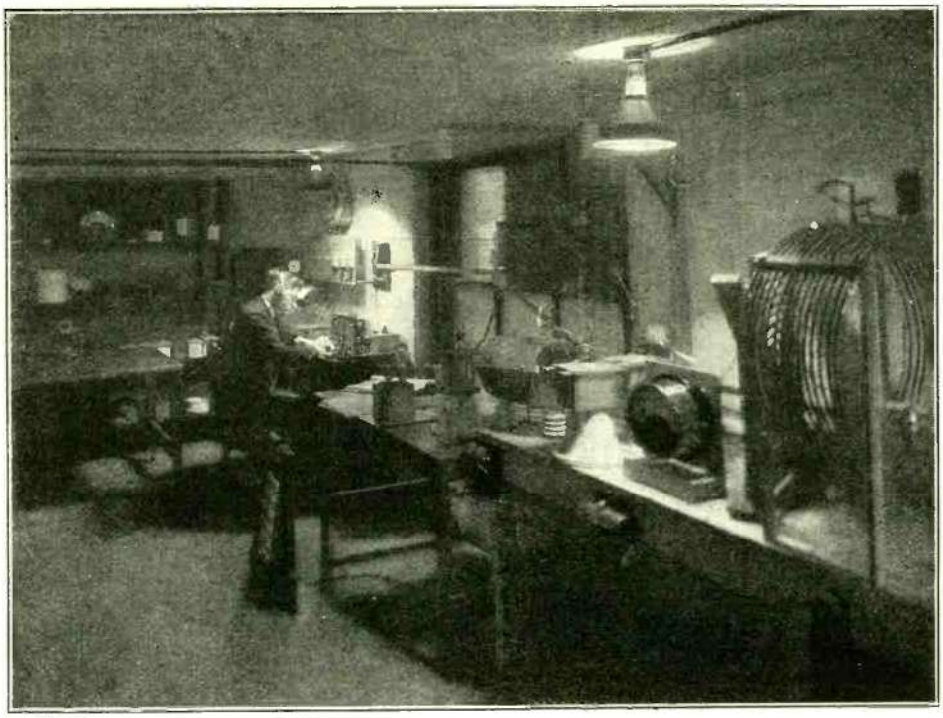


Fig. 1. A general view of the interior of British amateur radio transmitting station G-6XX. A. E. Treheam, the chief operator, is at the key. This station is located at Shepherd's Bush, London, and was erected in a room loaned by the Dubilier Condenser Co., Ltd. A special permit has been granted to use an input power of one kilowatt.

FOR the purpose of participating in this season's trans-Atlantic tests, a special station was erected and operated on behalf of the Radio Society of Great Britain under the call sign of G-6XX, the G prefix being added to designate British nationality in accordance with the scheme approved by the British Post Office. A special permit to use an input power of one kilowatt was granted for the purpose of the tests.

The station is situated at Shepherd's Bush, London, W., England, having been erected in a room loaned for the purpose in the works of the Dubilier Condenser Co., Ltd., which company also greatly assisted in fitting up the apparatus, etc. The aerial, of the inverted L type, is a six-wire cage on 7-foot spreaders, the flat top being about 75 feet long, and the down leads, a six-wire cage on loops of one foot diameter, about 40 feet long. One end of the aerial is supported by a 60-foot mast and the other by a brick chimney stack of about the same height. A six-wire counterpoise is slung beneath the aerial, extending from the window of the operating room to a point just beyond the further end of the aerial.

The vacuum tubes were supplied by the M. O. Valve Co., London, and were each capable of a plate energy dissipation of 450 watts. Two rectifying tubes were used for two-wave rectification at 6,500 volts, and two in parallel as oscillators.

The high-tension was obtained from a step-up transformer, fed at 600 cycles from a motor-generator, the signaling key being put in the primary circuit of this transformer. A general view of the interior of the station, showing the receiving position and controls, is reproduced in Fig. 1, and a view of the vacuum tube panel in Fig. 2. The four tubes in a row can be seen in the photograph, with the filament lighting transformers in the background, and the step-up transformers below the tubes.

SERIES FEED

A "series feed" of the high tension between the filaments of the oscillator tubes and the oscillator circuit was used, as shown in Fig. 3, since this arrangement was found somewhat more effective than the conventional "shunt feed" of the tube plates through radio frequency chokes.

The filaments are lighted from the 220-volt 50-cycle mains through step-down transformers in the usual manner, a potentiometer resistance being connected across the filaments of the oscillator tubes to obtain the electrical center of the filaments for the connection of the grid leak and the high tension supply.

As may be seen from the diagram, a loose coupling to the aerial circuit was employed, the main oscillation circuit consisting of a condenser of .0005 mfd. capacity with a portion of the primary coil. The aerial coil was a flat winding of copper strip, as may be seen in Fig. 4.

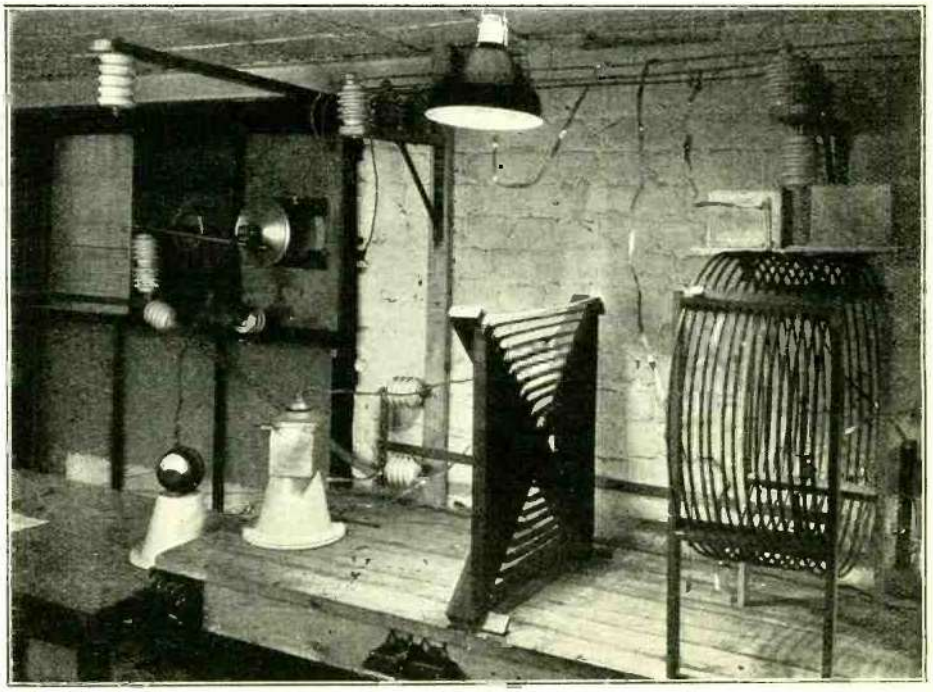


Fig. 4. A view of the apparatus composing the oscillating and antenna circuit. The antenna is coupled to the oscillating circuit by means of a spiral wound pancake coil. The series antenna condenser can be seen at the left of the second table perched atop a large porcelain insulator. The radiation ammeter is similarly mounted. Note the bulky aerial change-over switch.

The average aerial current is about 8 amperes at 193 to 200 meters. This current remains quite steady, even when the aerial swings in the wind, as the aerial circuit tuning is rather flat, while the wave-length is controlled almost entirely by the primary circuit, so that aerial changes make only small effects in the radiated wave-length.

The use of 600 cycles as the supply frequency for the rectifying tubes considerably simplifies the smoothing of the rectified current, so that by the use of a simple smoothing condenser the signal appears to be pure D.C.C.W. at any distance from the station.

The signals from this station have been reported by about 40 American and Canadian amateurs, as well as by the *Bowdoin* in the Arctic, and this in spite of the fact that the aerial is very much screened by surrounding buildings, an elevated railway track and other objects which must decrease the radiation of short wave-length signals.

SHORT WAVES

Experiments have also been made in the transmission of signals on about 120 meters from this station, using for this purpose special coils clipped on to the three feed leads between the tubes and the oscillation circuit. To facilitate such tests, these three leads—plate, grid and high tension positive—are carried along the test bench, overhead supported on porcelain insulators, as may be seen in the photographs, so that any convenient coil can be clipped on these leads in a few seconds.

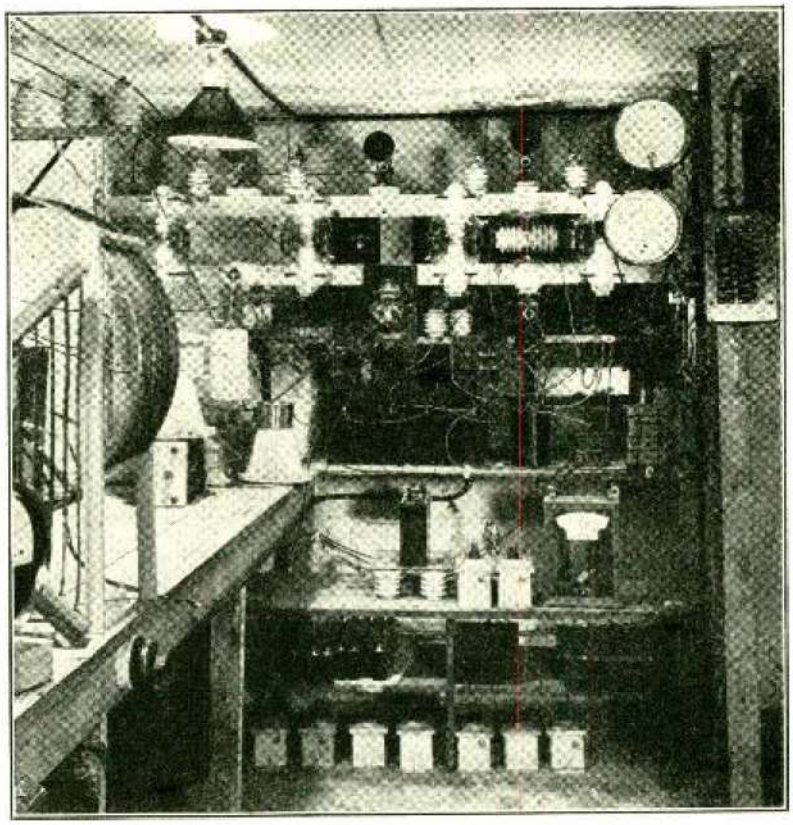


Fig. 2. A view of the vacuum tube panel. The four 450-watt transmitting tubes can be seen on the upper rack. The step-up transformers are located directly below the tube.

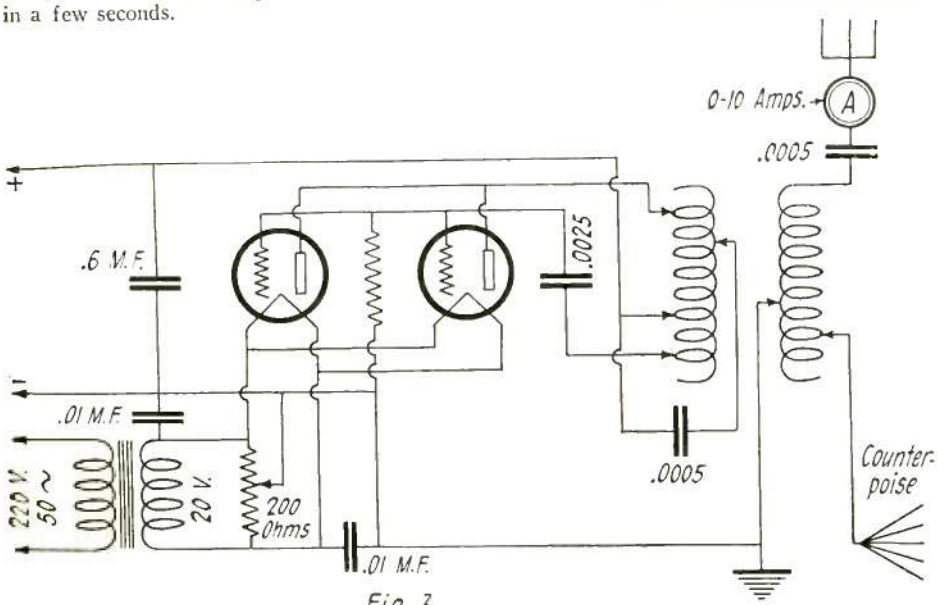


Fig. 3

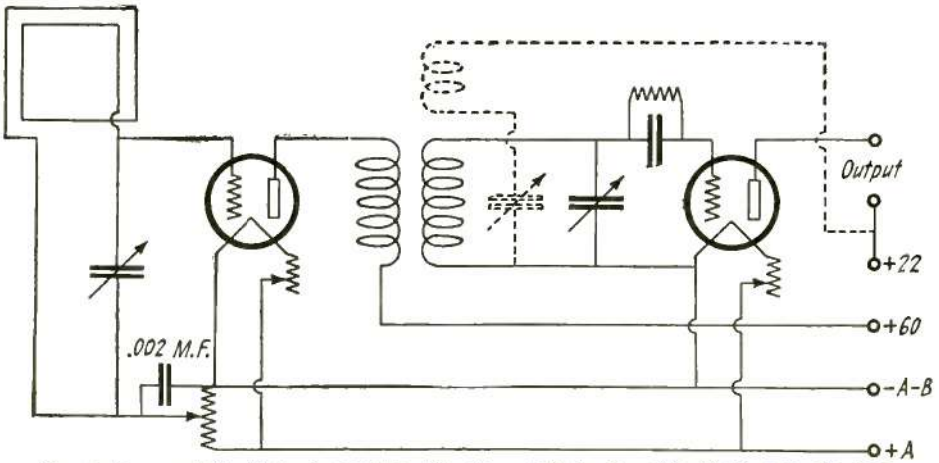
Schematic diagram of the transmitting circuit employed at station G-6XX. The manner in which the antenna is coupled to the main circuit is rather unusual.

A special aerial change-over switch is fitted which not only changes over the aerial from "send" to "receive," but also when in the latter position it interrupts either the primary oscillation circuit or the grid lead to the primary coil, as desired. The object of this is to prevent oscillations being set up by the tubes when listening for signals, as it has been found that these tubes oscillate quite strongly without any high tension supply at all, provided the filaments are alight—the pulsating electron emission caused by the 50-cycle heating current of the filaments being sufficient to set the primary circuit oscillating to an extent sufficient to prevent reception on nearby wave-lengths. Interrupting the grid lead to the tubes when the aerial switch is in the "receive" position entirely prevents this trouble.

Station—4EO—4ZD

THE accompanying cut shows the general layout of station 4EO—4ZD, owned and operated by Paul G. Watson, at 830 East Park Avenue, Savannah, Ga. The transmitter is a 100-watt Reinartz-Hartley set, while the receiver is one of the writer's own design.

The transmitter is built with a Hartley oscillator circuit, and is coupled to the antenna and counterpoise through two variable condensers, in order to work the set below the fundamental frequency of the antenna. At present it is tuned to 215 meters. The idea of enclosing the set in a cabinet is a departure from conventional C.W. design, and requires careful balancing in order to prevent heat from being generated to any appreciable degree. Two UV-203 tubes are used as oscillators. The system of balancing the counterpoise and antenna with variable condensers allows a very quick change



Circuit diagram of Mr. Watson's receiver. The stage of R. F. allows the effective use of a loop.